



At left, root knot on chard, caused by nematodes.



tic safety device, forcing the user to retreat from any concentration of chemical sufficient to prove injurious if inhaled. These nematocides are mostly chlorinated hydrocarbons sold under trade names such as Larvacide, D. D. mixture, and E. D. B. (Ethylene Dibromide).

New nematocides are developed every year. Some of the most recent are reportedly effective against nematodes on or in the roots of living plants without injury to the plants. This would be of great value, because in the past it has been impossible to kill the nematodes on an especially valuable plant, or to eradicate nematodes from a mixed home planting where the roots of the larger shrubs and trees occupy the soil over the entire yard.

New Chemicals Tested

This department has made tests of four of these new compounds, comparing them with an older standard nematocide. The new compounds now being tested are sold under the trade names of Nemagon, Emulsifiable Fumazone (the active agent in these two is the same) Vapam, and VC-13. VC-13 differs from the others in being much less volatile and consequently much slower acting and more persistent in the soil.

The new compounds were tested against the standard nematocide E.D.B. (Ethylene Dibromide) in all experiments. Each chemical was tested at three rates of application—that recommended by the manufacturer, half that rate, and twice that rate. Nearly a thousand recently hatched and presumably hungry nematodes were added to each pot of soil and each experiment was replicated three times.

Vapam was found to be particularly toxic and should not be used around living plants. While E.D.B. showed toxic symptoms only at the higher dosage levels, the manufacturer's recommendations are that no dosages be made around living plants. VC-13 and Fumazone (Nemagon is similar) were not toxic at any rate of application.

A series of tests were made, applying the chemical after plants were planted and



Roots of indicator plants after preplanting treatment with Vapam. Left to right, check, B-1, B-2 and B-3.

had emerged. Vapam was omitted from this test as it killed the plants. Seeds were planted in nematode-infested soil and the soil then was drenched with nematocide when the seedlings were two weeks old. The roots were washed free of soil and examined 21 days later.

Control Was Not Effective

To determine if live nematodes remained in the roots they were placed in sterile soil and okra planted. After 35 days the okra roots were washed and examined. The tests showed that nematodes were not effectively controlled by postplant treatments. Free-living nematodes, which feed upon plant roots but do not become embedded in them, might well be controlled by VC-13, Fumazone or Nemagon.

The four nematocides tested were very effective, our tests showed, as preplant treatments, but ineffective in killing nematodes in growing plants. However, we did learn that we have three products which can be used without injury to growing plants.

Testing New Nematocides

How Good Are They?

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Three of the seven known species of root-knot nematodes are common in Arizona and are becoming increasingly prevalent and destructive. They are so easily spread on infested plants or soil from infested areas, and their host range is so phenomenally large, that control is difficult.

As they can feed upon the roots of over 1,700 species of plants—including forage plants, small grains, grasses, fruits, vegetables, field crops (including cotton), flowers, shrubs and trees and even weeds—it is difficult to find a resistant plant to grow in nematode-infested soil.

Your Nose Protects You

The most effective control measure thus far has been treatment of infested soil with certain volatile compounds which kill the nematodes and also any plant roots in the treated area. While poisonous, these compounds have very unpleasant odors which act as an automa-